

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS,  
INC.

1791 Tullie Circle, N.E.

Atlanta, GA 30329

404-636-8400

TC MINUTES COVER SHEET

TC/TG/TRG NO TC 5.2 DATE January 31, 2017

TC/TG/TRG TITLE Duct Design

DATE OF MEETING January 31, 2017 LOCATION Las Vegas, NV

MEMBERS PRESENT	TERM TO	MEMBERS ABSENT	Y E A	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Bob Reid, Chair	6/30/17			Eric Adamczyk (G)
Tim Eorgan, Vice Chair	6/30/18			Kent Anderson (CM)
Scott Hobbs, Sec.	6/30/18			John Constantinide (CM)
Herman Behls	6/30/17			Charlie Culp (G)
Kevin Gebke	6/30/17			Justin Davies (G)
Vikram Murthy *	6/30/17			Gus Faris (CM)
Craig Wray	6/30/17			Ryan Gallagher (PCM)
Bill Stout	6/30/17	X		Robert Hassler (CM)
Johnny Andersson *	6/30/18	X		Mark Hooks (G)
Pat Brooks	6/30/19			Eli Howard (G)
David Dias	6/30/19			Steve Idem (CM)
John Hamilton	6/30/19			Gert Jensen (CM)
Cindy Bittel	6/30/20			Ralph Koerber (CM)
Bill Smith	6/30/20	X		Bruce Meyer (CM)
Neal Walsh	6/30/20			Shawn O'Hara (G)
				Mark Owen (G)
				Perry Philip (PCM)
				Chris Van Rite (CM)
				Larry Smith (CM)
				Mark Terzigni (CM)
				Alexander Zhivov (G)

\* Member Non-Quorum

CM = Corresponding Member

PCM = Provisional Corresponding Member

G = Guest

DISTRIBUTION

All Members of TC plus the following:	
TAC Section Head	Ken Peet
TAC Chair	Michael Bilderbeck
2017 Handbook Liaison (Fundamentals)	Larry Akers
2020 Handbook Liaison (Systems & Equipment)	Florentino Rodriguez
Research Liaison	David John
Standards Liaison	Dr. Arsen Melikov
ALI/PDC	James Bochat
Chapter Tech Transfer	James Arnold
Staff Liaison	Mike Vaughn

**AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING  
ENGINEERS**

**1791 Tullie Circle, N.E.  
Atlanta, GA 30329**

**ASHRAE Winter Conference, Las Vegas, NV**

**TC 5.2 Duct Design**

**Tuesday, January 31, 2017  
Time: 3:30-6:00 PM**

**Location: Caesars Palace  
Pompeian III (Promenade)**

- 1) **Call to Order** – 3:35 PM
- 2) **Introductions and Attendance**
  - a) Introductions
  - b) Quorum: Yes (15 of 15 voting members present)
  - c) Agenda approved.
- 3) **St. Louis (June 2016) Meeting Minutes**
  - a) Minutes from the St. Louis meeting were approved by electronic ballot September 20, 2016 8-0-0 CNV.
- 4) **Special Announcements**
  - a) ASHRAE Code of Ethics – “As members of ASHRAE or participants in ASHRAE committees, we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct.”
  - b) ASHRAE Vision - ASHRAE will be the global leader, the foremost source of technical and educational information, and the primary provider of opportunity for professional growth in the arts and sciences of heating, ventilating, air conditioning and refrigerating.
- 5) **Section Head Report**
  - a) Section 5 chair to spearhead a section meeting to work on common technical issues. Bob Reid and Tim Eorgan noted TC’s with overlapping scopes could merge in the future.
  - b) Ken Peet encouraged online meetings, such as ‘Go to Meeting’ for sub-committee meetings prior to the next ASHRAE Conference.
  - c) Conference Registration. There was discussion regarding costs associated with registering for ASHRAE Conferences.
  - d) Please update on-line your ASHRAE bio.
- 6) **Chair Report (Bob Reid)**
  - a) Acknowledged our Provisional Corresponding Members present: Ryan Gallagher (Ferris State University) and Perry Philp (Peppertree Air Solutions).
  - b) Historian (open)
  - c) TC 5.2 Roster. Encouraged members to promote involvement by contractors, engineers, project managers, owners and HVAC professionals.

- d) Education internal to the TC
  - i) Possible future sessions --- suggestions welcome
  - ii) Proposal for Long Beach roundtable --- “What If We Made a Better Air Handling System and No One Cared?” A discussion into this topic can be discussed at the Long Beach meeting for possible future meeting in Chicago, 2018. Craig Wray was assisting with discussions involving DOE staff. Other volunteers were John Constantinide and Scott Hobbs.

7) **Subcommittee Reports**

- a) Handbook (Herman Behls)
  - i) 2017 Handbook: Fundamentals – Duct Design chapter submitted to staff 1/10/2017’ Motion to approve by Herman Behls. Kevin Gebke seconded. Approved by roll call 14-0-0 CNV. See Attachment 1 for a summary of significant changes to the design chapter
  - ii) 2020 Handbook: HVAC Systems & Equipment, Duct Construction chapter. Need chair for 2020 Duct Construction chapter update.
  - iii) 2021 Handbook: Fundamentals, Duct Design chapter. Need chair for 2021 Duct Design chapter update.
- b) Membership (Cindy Bittel). Met with 10 young engineers. Many are unaware of ASHRAE technical committees and how they can get involved. John Constantinide further explained ASHRAE approved presentations are available to TC members to recruit membership at local ASHRAE chapters.
- c) Programs (Steve Idem)
  - i) Attended SPIDA seminar at this Conference. I inquired about future collaboration with SPIDA with respect to their programs.
  - ii) Three RP-1682 (Study to Identify CFD Models for Use in Determining HVAC Duct Fitting Loss Coefficients) papers are ready for presentation.
- d) Duct Design Guide (Pat Brooks)
  - i) 19- section Equal Friction and Static Regain example problems completed using the Duct Fitting Data Base.
  - ii) TC members requested to go to the following web site for the latest draft of each chapter. Written comments welcomed.
    - Site address: <http://files.ashrae.org/>
    - Username: tc5.2ddg
    - Password: DDG@dmin1

- e) Duct Fitting Database -- DFDB (Herman Behls and Pat Brooks)
  - i) The Stand-Alone and Online DFDB's are being promulgated by ASHRAE.
  - ii) The Online DFDB is a Beta version.
  - iii) Purchasers of the Online DFDB receive the Stand-Alone DFDB, Version 6.00.05.10 with a complimentary copy of the Online DFDB for comments.
- f) Code Interaction (Ralph Koerber)
  - i) IAPMO Duct Construction Working Group- The Duct Task Group work is considered complete with the submission of proposal to the UMC and thus this group will no longer meet. Comments to be reviewed and published by the technical committee on March 24. These comments will then be acted on by the committee at the May 1 meeting.
  - ii) Ralph Koerber confirmed IAPMO comments (72/78) of UMC) will be withdrawn by ASHRAE.
  - iii) The Codes and Standards task force also studied the use of gypsum board as an air duct system and developed draft language to be reviewed and submitted for the Duct Design Guide. Looking for specific proposals. Sub-committee continues to review a develop guidance language.
  - iv) NFPA 90A and 90B - reviewed of 2<sup>nd</sup> draft cycle timeline.
- g) ASHRAE Learning Institute (ALI) (Pat Brooks)
  - i) ASHRAE looking for Distinguished Lecturers. If interested, contact John Constantine.
  - ii) if interested in the Duct Design Guide contact Pat Brooks.
- h) Webmaster (John Constantine)
  - i) TC5.2 Website: <https://TC0502.ashraetcs.org/>
- i) Liaison Reports
  - i) 90.1 (Mark Smith). No report. I am waiting for confirmation
  - ii) SSPC 189.1 (Scott Hobbs). Nothing to report. I am waiting for approval.
- j) Research (Behls)
  - i) 1180-RP Duct Design Guide -- After default of original contractor, this project is being completed by TC5.2. Ongoing.
  - ii) 1682-RP -- Study to Identify CFD Models for Use in Determining HVAC Duct Fitting Loss Coefficients. Principal investigator presented results at Orlando meeting (January 2016). Final report was approved by TC5.2 by electronic ballot 10-0-0 CNV (15) on 1/2/17.
  - iii) WS-1764 Determine the Absolute Roughness of Phenolic Duct --- Project approved by RAC at this Convention. SMACNA dedicated their \$10,000 annual contribution to this project. Project will be bid this spring.
  - iv) Draft RTAR for "Inlet and Outlet System Effects on Multiple Plenum Fans in a Parallel Arrangement (Fan Arrays) for Air and Sound Performance" --- request received from TC 5.1 (Fans) that we co-sponsor the proposal. Letter of support for co-sponsorship sent from Bob Reid to Brian Reynolds (TC 5.1 chair) on 12/12/16.
- k) Standards
  - i) SPC 120-2017 "Method of Test to Determine Flow Resistance of HVAC Ducts and Fittings" (Kevin Gebke) – Published.
  - ii) Standard 126-2016 "Method of Testing HVAC Air Ducts" (Kevin Gebke) -- Published.
  - iii) Standard 215P "Method of Test to Determine Leakage of Operating HVAC Air Distribution Systems" Craig Wray – We had our 28<sup>th</sup> meeting Monday. Committee expects to approve for public review by the Long Beach meeting (June 2017)

- 8) **Deadlines** – None.
- 9) **New Business** – None.
- 10) **Action Items**

<b>Action Items</b>			
<b>Number</b>	<b>Description</b>	<b>Assigned to</b>	<b>Status</b>
1	Add new fittings to DFDB as determined by plasma machines and/or catalogs	Larry Smith Herman Behls	Active
2	RTAR covering cost to seal ductwork	Neil Walsh Pat Brooks	Active (Initiated January 2014)
3	FAQ (Remove from ASHRAE'S system)	<u>Bob Reid</u>	<u>Active</u> <u>(Initiated June 2016)</u>

- 12) **Adjournment** – 6:05 PM

# Attachment 1

## 2017 Duct Design Chapter Changes (Summary of Significant Changes)

1. Shading (recommended friction rate design range) removed from Friction Chart.
  2. Duct Fitting Database
    - a. Added the following design tools
      - CD11-3, Straight Duct. Round. **Velocity Limited (Maximum)**
      - CD11-4, Straight Duct, Round, **Friction Rate Constant**
      - CD11-5, Straight Duct, Round. **Minimum Velocity**
    - b. Added Terminal Unit Loss Coefficient Section.
      - Shows how to determine the total pressure loss coefficient (C) from manufacturers published data.
- Commentary. ASHRAE Standard 130-2016 (Laboratory Methods of Testing Air Terminal Units) shows how to determine “C” from laboratory data.
3. Flexible Duct
    - a. Chapter retains the 6 ft limitation, fully stretched.
    - b. Added flexible straight duct example featuring the use of CD11-2 and the effect of 4%, 15% and 30% compression.
    - c. Added flexible duct elbow example problem featuring CD3-23.
  4. Added Physical Security Considerations (submitted by John Constantinide)
  5. Revised entirely the Duct Design Section
    - a. Includes Philosophy of Duct Design
      - a1. The goal of duct design is an air distribution system without objectionable noise and minimum life cycle cost (LCC).
    - b. Noise control
      - b1. Includes a table of recommended maximum airflow velocities to control NC or RC space noise levels.
    - c. Features Two Design Methods
      - c1. Equal Friction
      - c2. Static Regain
    - d. Explains what design method to use for the following HVAC systems
      - d1. Supply systems
        - d1.1 VAV boxes, upstream
        - d1.2 VAV boxes, downstream
        - d1.3 CV systems
      - d2. Return air with a return air fan
      - d3. Return air with a relief air fan

- e. Design recommendations
- Lists 14 design recommendations from various published documents and ASHRAE Journal articles.
- f. Example 9-section duct design problem (Figure 1) for both Equal Friction and Static Regain based exclusively using the DFDB design tools, fitting loss coefficients, and duct-mounted component loss coefficients (VAV boxes).

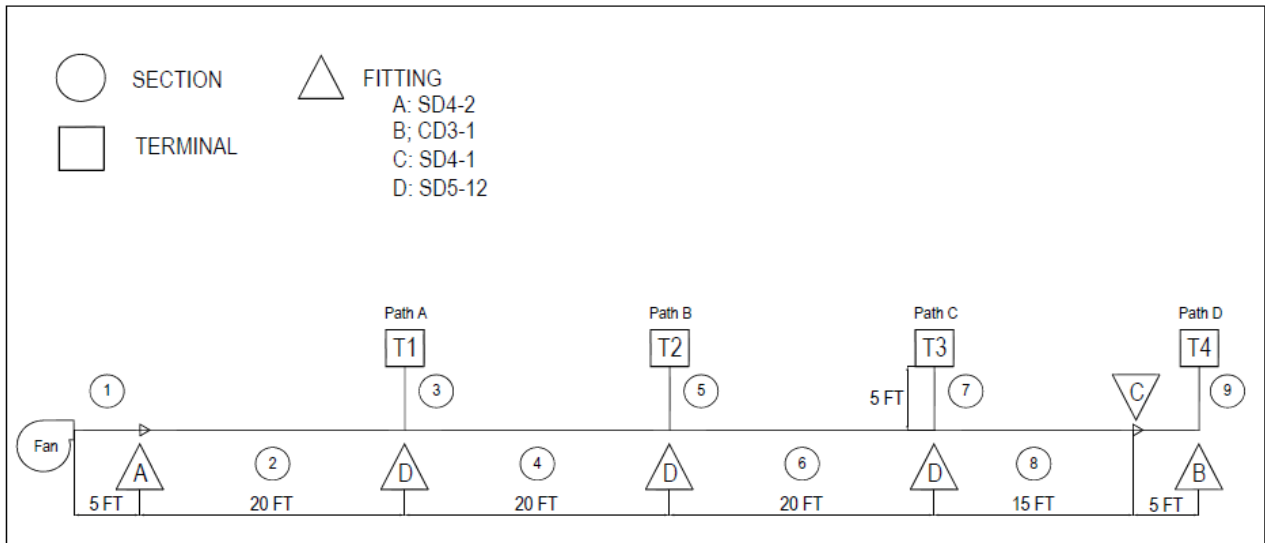


Figure 1